Transit Use by Young People in Times of Financial Austerity: A Cause of Equity Concern?

Sigal Kaplan
Associate Professor, Technical Univesrity of Denmark, Denmark
João de Abreu e Silva
Assistant Professor, Instituto Superior Técnico of Lisbon, Portugal
Floridea di Ciommo
Associate Professor, Universidad Politecnica de Madrid-TRANSyT, Spain

SUMMARY

This study investigates the effect of price and travel time fairness and spatial equity in transit provision on the perceived transit service quality, willingness to pay, and habitual frequency of use. Based on the theory of planned behavior, we developed a web-based questionnaire for revealed preferences data collection. The survey was administered among young people in Copenhagen and Lisbon to explore the transit perceptions and use under different economic and transit provision conditions. The survey yielded 499 questionnaires, analyzed by means of structural equation models. Results show that higher perceived fairness relates positively to higher perceived quality of transit service and higher perceived ease of paying for transit use. Higher perceived spatial equity in service provision is associated with higher perceived service quality. Higher perceived service quality relates to higher perceived ease of payment, which links to higher frequency of transit use.

1. INTRODUCTION

Growing number of consumers are increasingly concerned about fairness for themselves as well as others through socially responsible consumption (e.g., Arnot et al., 2006; Reinstein and Song, 2012, Webb et al., 2008). Evidence shows that customer loyalty, willingness to pay and purchase intentions are associated with perceived fairness, because consumers are willing to pay higher prices, associate higher quality and switch to products that are linked to social corporate responsibility and fair trade (e.g., Martin et al., 2009; Reinstein and Song, 2012; e.g., Lotz et al., 2013). Moreover, consumers are willing to punish firms for perceived unfair prices (Schein, 2002) and socially irresponsible behavior (Arredondo Trapero et al, 2010). Consumers' consideration of fairness grows stronger in times of economic recession due to increasing frustration over their salary erosion and need to face higher prices and shrinkage of products and services (Ferguson, 2014). A recent example is the housing affordability crisis that triggered mass protests across countries (e.g., Spain, United States, Israel) and the formation of the international occupy movement linking housing affordability to social justice (see, e.g., Alimi, 2012).

Perceived fairness is also highly relevant to the implementation of transport policy. Studies from the last decade show that perceived fairness relates to the acceptability of road pricing schemes and that the findings are replicated across countries in Europe, United States and Asia (Fujii et al, 2004; Cools et al., 2011; Di Ciommo et al., 2013; Kim et al., 2013). A recent study in Scandinavia found fairness relevant to the implementation of safety policy measures (Eriksson and Bjørnskau, 2012). Two studies investigated the role of price fairness in the context of transit: Eriksson et al. (2006) found that fairness relates positively to the acceptability of reduced fair prices in transit in Sweden; Drevs et al. (2014) found that in Germany information about transit subsidies lead to higher willingness to pay.

This study focuses on the effect of perceived fairness and corporate social responsibility on habitual transit use. We investigated six hypotheses regarding the effect of price fairness, travel time fairness, and spatial equity in transit provision, on the perception of transit service quality, willingness to pay and habitual frequency of use. Framing the analysis within the theory of planned behavior (TPB), we developed a custom-designed web-based questionnaire for data collection. The questionnaire elicited the frequency of transit use, individual socio-economic characteristics, and latent variables comprising attitudes, subjective norms and perceived difficulties associated with transit use. The attitudes related to the perceived price fairness, travel time fairness compared to the car, and equity in transit between north and south and between metropolitan core and periphery. The subjective norms referred to car-, transit- and bicycle-oriented behavior of family and friends. The difficulties were associated with service quality (e.g, availability, frequency, operating hours, comfort), lack of personal security, and difficulties associated with the monetary burden of paying for transit.

The survey was administered among university students in Copenhagen and Lisbon to explore the transit perceptions and use by young people under various economic and transit provision conditions. In Portugal, the on-going recession is imposing a significant economic burden on young people in their twenties, who are among the most affected people by the economic crisis with high unemployment. Transit prices have increased dramatically in the last two years, the concessionary fares for teenagers and elderly have been cancelled, and the supply has suffered significant reductions in frequencies and operating hours, in particular in the evening and early morning. Combined with high unemployment rates and reductions in the households available income, this has resulted in heavy transit patronage in the Lisbon Metropolitan Area decreasing by 15% in the first trimester of 2013, continuing a trend from 2011. In Denmark, the economic crisis had a less effect on young people, concessionary fares are available for elderly and adolescents, and the transit provision is relatively equitable in terms of connectivity across the metropolitan area (Popoks et al., 2014). Nevertheless, transit prices are relatively high, some areas where students reside suffer from connectivity gaps (Popoks et al., 2014), and re-organization processes have led to a reduction of direct bus services in peripheral areas. According to national statistics, about 25% of the young Danes in their twenties travel to

work by transit (Sigurdardottir et al., 2013).

The current study is free from the limitations of its predecessors. Firstly, the two studies on fairness in transit provision investigated stated preferences in reaction to hypothetical scenarios describing a favorable policy, which are susceptible to incentive compatibility bias and strategic response bias (Wang et al., 2007). Instead, we elicited revealed preference of actual transit use frequency and perceived burden associated with actual transit expenditure, which are bias free. Secondly, previous studies disregarded the comparative nature of fairness, which refers to consumers' feelings as the result of a price comparison to explicit reference price of comparable others or to implicit price reflecting norms or beliefs (Xia et al., 2004). This study acknowledges the comparative nature of fairness in the design of the questionnaire items as comparative statements referring to reference population groups and transport modes. Thirdly, previous studies disregarded also the difference between fairness to oneself and for others, both translating into consumption patterns and preferences, as consumers begin to consider the public consequences of their actions and their ability to induce social change through their purchasing power (Xia et al., 2004; Webb et al., 2008). This study addresses price and travel time fairness to one self, as well as equity in spatial transit provision for others. Last, previous studies considered only the monetary dimension, while the this study accounts for the multiple dimensions influencing transit choices including prices, travel time, service quality and personal security.

The remainder of the paper is organized as follows. Section 2 focuses on methodological issues, namely the conceptual framework, the research hypotheses and on the model estimation. Section 3 presents the data collection issues, including survey design, administration and sample characteristics. Section 4 describes the empirical results of the model estimation and Section 5 draws the conclusions.

2. METHODOLOGY

2.1 Research hypotheses

The behavioral framework to explore the research hypotheses on the relationship between perceived equity and transit use by young adults is loosely built upon Ajzen's (1991) theory of planned behavior (TPB). According to the TPB, favorable attitudes and subjective norms towards the behavior and greater perceived behavioral control (ease) of conducting the behavior lead to stronger intentions to perform the behavior. These intentions will eventually transform into observed behavior, provided the availability of resources and the ability to choose one's own behavior. The TPB has been previously confirmed applicable for describing transit use intentions (e.g., Farag and Lyons, 2010; Chen and Chao, 2011). In this study, we extend the TPB to include fairness as attitudinal constructs, difficulties associated with service quality, and willingness to pay, as additional

fundamental factors influencing transit use intentions.

This study postulates that two equity concepts may have an impact on the decision to use transit. The concepts are fairness and corporate social responsibility (CSR), known to influence consumer satisfaction and purchase intentions of products in other industrial sectors (Xia et al, 2004; Webb et al., 2008).

In regard to fairness, we address price and travel time fairness. ***Price fairness*** refers to consumer attitudes regarding price acceptability as the result of the comparison of a price of a product or service to the reference price of comparable others (e.g., a reference population group) and the possibility to justify the price difference. The reference price may be explicit, reflecting an observed price, or implicit, reflecting norms or beliefs (Xia et al., 2004). Within the transport context, travel time is a highly valued resource and hence in this study we suggest to explore ***travel time fairness*** in an analogous manner to price fairness. Travel time fairness in this study refers to the perceived travel time by transit in comparison with travel time by car as the reference travel mode.

Corporate social responsibility (CSR) can be defined as the consideration by companies of the effects of their actions on relevant others (e.g., customers, community), their commitment to improving the well-being of their customers, and their actions towards maximizing long-run societal benefits (Webb et al., 2008). As a measure of CSR in the transport sector, we propose ***spatial equity in service provision***, because the consideration of social impacts and distributional effects by transit operators fundamentally relates to the quality of life and the social well-being of individuals and communities in urban and peripheral areas (e.g., Geurs et al., 2009; Jones and Lucas, 2012).

Previous empirical findings from other industrial sectors show that fairness perceptions explain consumer satisfaction, favourable attitudes towards the supplier (e.g., Webb et al., 2008), willingness to pay for goods or services (e.g., Chung et al., 2011), and eventually purchase intentions (e.g., Schein, 2002). Accordingly, we postulate three hypotheses about the linkage between fairness and transit use:

H1: Higher perceived price/travel time fairness positively relates to higher perceived quality of transit service.

H2: Higher perceived price/travel time fairness positively correlates higher perceived ease of monetary expenditure on transit use.

H3: Higher perceived price/travel time fairness in transit links to higher frequency of transit use.

Previous empirical findings from other industrial sectors indicate that CSR relates to higher

positive evaluation of product quality (Lotz et al., 2013), and higher willingness to pay (Arredondo Trapero et al., 2010), while they are also willing to penalize companies with socially irresponsible behavior (Arredondo Trapero et al., 2010). Therefore, we explore three hypotheses about the linkage between CSR and transit use:

H4: Higher perceived CSR is associated with higher perceived service quality.

H5: Higher perceived CSR relates to higher perceived ease of monetary expenditure on transit use

H6: Higher perceived CSR correlates with higher frequency of transit use.

While the aforementioned hypotheses are based on empirical findings from other fields, their exploration within the context of travel choices and transit use is far from trivial due to three reasons. Firstly, the hypotheses may apply only to certain types of consumers who are socially responsible and are not transit captives. Secondly, transit is a public service and thus essentially differs from private sector products and services. In regulated or franchised transit systems, users cannot choose between different suppliers of the same service, but rather decide whether to use the service and with which frequency. Thirdly, transit operators do not brand their systems with respect to price fairness or CSR, so the perception of transit as fair or equitable is intrinsic and based on individual knowledge and social awareness. Nevertheless, price fairness and short-term impacts of CSR are highly visible in transit. Consumers are aware of prices and concessionary fares for different population groups, and can experience the level of service and accessibility for their own activity patterns as well as for others.

2.2 Estimated models

The hypothesized behavioral model structure was investigated by applying structural equation modeling (SEM). This methodology and its application in travel behavior research in the last three decades were reviewed by Golob (2003). The model in this study contained two sets of equations: measurement equations linking the latent TPB constructs to the questionnaire items, and structural equations linking the latent TPB constructs to the characteristics of the individuals and the environment where they travel. The parameters of the two sets of equations were estimated simultaneously by Bayesian Estimation (Byrne, 2010) that accommodates satisfactorily the non-normal Likert items in the measurement equations and uses Markov Chain Monte Carlo simulation for obtaining the posterior distribution of the parameters. Confidence intervals are obtained in the estimation and are consistent with any sample size and data distribution. Alongside the traditional descriptive measure of chi-square test of absolute model fit, maximum likelihood estimation has been performed to obtain the Comparative Fit Index (CFI) and the Root Mean Square of Approximation (RMSEA).

3. DATA

3.1 Survey design

The data were collected by means of a tailor-made web-based questionnaire that elicited transit use frequency, willingness to pay, service quality, perceived fairness and CSR, subjective norms and individual socio-economic characteristics. The variables and measurement scales are provided in Table 1.

Transit frequency use was elicited for traveling to university and leisure activities as habitual destinations. Perceived monetary burden or difficulties to pay associated with transit costs were considered as surrogate measure of willingness to pay because willingness to pay is very difficult to measure for regulated transit systems. Perceived quality of service was elicited for the preferred transit mode from the residential location to the habitual destinations of the university and leisure activities. Perceived quality of service concerns one's subjective evaluation of travel time in minutes and perceived quality of travel time, as well as perceived difficulties to use transit due to factors associated with service quality (i.e., walking distance, travel time, frequency, operating hours and crowding, personal security).

Price fairness was explored via comparative statements regarding prices paid by young adults with respect to prices paid by reference age groups that possibly have concessionary fares (i.e., elderly, teenagers) or are perceived to have higher purchase power (i.e., adults in their forties). Travel time fairness was elicited by requesting respondents to rate the quality of their travel time by transit in comparison with the time by car as the reference travel mode to university and leisure activities. Spatial equity in transit provision was investigated via comparative statements about the service quality aspects of transit service (i.e., travel time, walking distance, information provision, service frequency) in the urban core versus the metropolitan periphery and in the north versus the south of the metropolitan area as geographical areas typically associated with different socio-economic levels.

Individual information comprised age, gender, having children, home ownership, residential location and building type, employment status, having a scholarship for tuition or living, education level and income of the respondents and related family members. Subjective norms referred to the norms resulting from the behavior of family and friends and regarded car, transit and bicycle use.

Latent construct	Variable name	Variable description	Measurement unit
Spatial inequity in transit service provision between the	a4stud_south_saf	Students in southern areas feel less safe when traveling in the evening	5 points Likert scale from highly disagree (1) to highly
	a4stud_south_dir	Students in southern areas have less direct transit services	
	a4stud_south_info	Students in southern areas have less real-time	

north and the south		information at bus stops	agree (5)
Spatial inequity in transit service provision between the center and the periphery	a4stud_south_wlk	Students in southern areas have longer walking distance for transit	5-point Likert scale ranging from very poor (1) to very good (5)
	a4stud_south_wt	Students in southern areas have longer waiting times for transit	
	a4stud_south	Students in southern areas have a worse transit service	
	a3stud_perif	Students in peripheral areas have a worse transit service	
	a3stud_perif_dir	Students in peripheral areas have less direct transit services	
	a3stud_perif_info	Students in peripheral areas have less real-time information at bus stops	
	a3stud_perif_wlk	Students in peripheral areas have longer walking distance for transit	
	a3stud_perif_wt	Students in peripheral areas have longer waiting times for transit	
Price unfairness of students with respect to other population groups	a2diff_stud_fort	Students have more difficulties to pay the cost compared to adults in their forties	
	a2diff_stud_old	Students have more difficulties to pay the cost compared to elderly	
	a2diff_stud_teen	Students have more difficulties to pay the cost compared to teenagers	
	a2stud_old	The cost for students is much higher than for elderly	
	a2stud_teen	The cost for students is much higher than for teenagers	
Low transit service quality	a6pt_wlkfar	The walking distance to the nearest transit stop is too far for me	
	a6pt_longtime	The travel times by transit are too long for me	
	a6pt_endsearly	The transit operating hours on weekdays are too short for me	
	a6pt_crowd	The transit is too crowded for me	
	a6pt_freqlow	The transit frequency is too low for me	
	a6pt_schedule	The transit time table does not fit my schedule	
Ease of payment for transit	a6pt_nexpensive	Transit is not expensive for me	
	a6byke_cheapr	Riding a bicycle is cheaper than using transit (R)	
	a6pt_cheap	Transit is cheaper than using the car	
	a6savemoneyr	I try to avoid using transit in order to save money	
Social norms of car use	a5friendcar	Most of my friends travel by car	
	a5friendpt	Most of my friends travel by transit (R)	
	a5scirclept	People of my social circle do not usually use transit	
Social norms of bicycle use	a5friendbyke	Most of my friends travel by bicycle	
	a5fambyke	Most of my family members travel by bicycle	
	a5carcool	My friends think that driving a car is cool	
	a5bykecool	My friends think that riding a bicycle is cool	
Lack of personal security in transit	a6pt_harassed	I feel insecure in transit because I am afraid to be harassed	
	a6pt_pickpocketing	I feel insecure in transit because of pick-pocketing	
	a6pt_ridesaft	I feel insecure riding the transit at night	
	a6pt_walksaft	I feel insecure walking/waiting to the transit at night	
Travel model fairness	q_ttime_u	Quality of Travel time to the university	
	ctt_car_univ	Quality of travel time by preferred transit service mode compared to travel time by car to the university	
	ctt_car_leis	Quality of travel time by preferred transit service mode compared to travel time by car to leisure activities	

Table 1 - latent constructs, variable name, description and measurement scale

3.2 Survey administration

The chosen target population for the survey were university students as prospective highly skilled knowledge-workers, because their attraction and retention as facilitators of regional growth and innovation are key in the transition from recession to prosperity. In addition, a key element towards facilitating the transition to more sustainable transport modes lies in a better understanding of the needs and preferences of young people who are in the initial stages of developing transport-related habits.

The survey was administered among young people in Copenhagen and Lisbon through university networks and included versions in Portuguese, Danish and English. In Lisbon, the survey was administered among students in the two campuses of the Instituto Superior Técnico and in Copenhagen the survey was administered at the Technical University of Denmark, the Copenhagen Business School and the University of Copenhagen. In the two cities, the campuses vary in their degree of accessibility from different parts of the metropolitan area. The survey was anonymous. In order to verify the sample reliability, the respondents were offered to participate in a raffle of 5 "iPod Shuffle" music players as an incentive for providing their contact details at the end of the survey.

3.3 Sample characteristics

The data comprises of 499 completed questionnaires (42.7% completion rate), of which 54.1% were participants from Lisbon. Among the participants, the average age is 23.1 years (SD=2.93), 58.1% are male, 45.9% are Master students and 9.8% are doctoral students. Of the respondents, 28.9% have a part time job, 6.0% have a full time job and another 8.0% receive a scholarship. Of the respondents, 15.0% reside in the dormitories, 35.7% in a shared rental arrangement and 42.9% with their parents. 31.7% reported a monthly household income of 1,000 Euro or less, and 28.2% percent have a monthly household income of 1,000-2,000 euros. 86.2% of the respondents reside in the northern part of the metropolitan area and 41.9% reside in centrally located neighborhoods.
54.5% and 40.5% of the respondents indicated that they travel by transit as their main travel mode to the university and to leisure activities, respectively. 47.9% of the participants use transit and another 16.6% use transit 2-3 times weekly. In comparison, 21.0% use the car and 64.5% cycle on a daily basis. The sample characteristics in Lisbon and Copenhagen are detailed in table 2.

Variable	City		
		Male	Female
Gender	Lisbon	57.0	43.0
	Copenhagen	40.6	59.4
Age		Average	Std.

	Lisbon	22.4	3.0			
	Copenhagen	23.9	2.6			
		None	Scholarship	Part-time	Full-time	
Job	Lisbon	82.8	6.6	5.8	4.8	
	Copenhagen	74.3	1.4	23.0	1.2	
		Dorms	Rent alone	Rent share	Own alone	With family
Residence Type	Lisbon	1.1	5.9	17.8	2.6	8.7
	Copenhagen	24.1	9.6	48.9	4.4	70.0
		< 0.5K	0.5-1K	1-1.5K	1.5-2K	> 2K
Household Income (€)	Lisbon	4.1	17.4	16.7	13.0	48.9
	Copenhagen	6.1	37.6	14.8	11.8	29.7
		Rarely	2-3 times Monthly	Once a week	2-3 times weekly	Daily
Car use frequency	Lisbon	21.5	15.2	12.6	16.7	34.1
	Copenhagen	67.7	16.6	6.1	3.9	5.7
		Rarely	2-3 times Monthly	Once a week	2-3 times weekly	Daily
Transit use frequency	Lisbon	14.1	5.2	8.2	12.6	60.0
	Copenhagen	6.6	19.7	18.8	21.4	33.6
		Rarely	2-3 times Monthly	Once a week	2-3 times weekly	Daily
Bicycle use frequency	Lisbon	21.9	6.3	3.0	14.1	54.8
	Copenhagen	3.1	3.5	4.4	13.1	76.0

Table 2 – Sample characteristics

4. MODEL RESULTS

Figure 1 illustrates the path diagram of the structural relationships among the latent constructs obtained in the estimated model, and Tables 3-5 detail the direct effects of the structural equations, and the estimated covariance structure from the Bayesian estimation. Table 3 presents the measurement equations. Table 4 shows the linkage between individual characteristics and the TPB constructs. Table 5 complements figure 1 by describing the magnitude of the linkage between fairness, spatial equity, service quality, payment ease and frequency of transit use. Goodness-of-fit indices reveal that the model fits extremely well, as the CFI is 0.881, the ratio between chi-square and degrees of freedom is 2.19 (Chi-square = 2310.99, DF = 1055), well below the maximum acceptable value recommended by Ullman (1996), and the RMSEA is equal to 0.049, which indicates a close fit of the model in relation to the degrees of freedom.

The results confirm hypotheses H1 and H4 at the 0.05 significance level. The perceived difficulties related to the service quality of transit service perceived as more difficult with: (i) higher perceived price unfairness; (ii) lower perceived mode fairness; (iii) higher perceived spatial inequity between center and periphery; (iv) higher perceived spatial unfairness between the north and the south of the metropolitan area.

The results confirm hypotheses H2 and H5 at the 0.05 significance level. Higher perceived ease of payment directly relates to lower perceived price unfairness and to lesser difficulties associated with the quality of service. Thus, higher perceived ease of payment

indirectly relates to: (ii) higher perceived mode fairness, (iii) lower perceived spatial inequity between center and periphery; (iv) lower perceived spatial unfairness between the north and the south of the metropolitan area.

The results confirm hypotheses H3 and H6 at the 0.05 significance level. Higher frequency of transit use is directly related to the perceived ease of payment, and thus indirectly related to the hypothesized fairness and equity constructs. Higher frequency of transit use is indirectly related to: (i) lower perceived price unfairness; (ii) higher perceived mode fairness; (iii) lower perceived spatial inequity between center and periphery; (iv) lower perceived spatial unfairness between the north and the south of the metropolitan area.

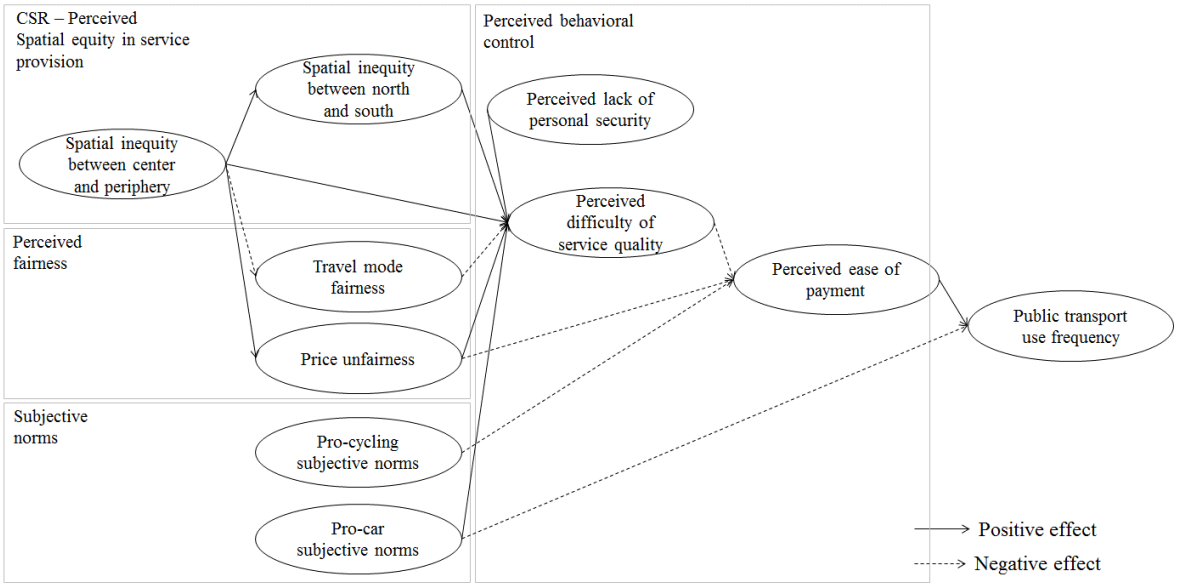

Fig. 1 – Path diagram of the structural relationships among the latent constructs

The perceived fairness and spatial equity in transit provision are associated with individual characteristics. Students with low income (earning less than 1,000 Euros a month) perceive higher price unfairness. Students residing in Lisbon perceive higher spatial unfairness between the north and the south and between the core and the periphery, while they perceive lower price unfairness than the students in Copenhagen. This result is reasonable because the two cities differ in their price scheme and spatial connectivity. The transit in Copenhagen is characterized by high equity in service provision because of the finger plan (Popoks et al., 2014), and provides concessionary fares for adolescents and elderly, while young people in their twenties do not enjoy concessionary fares. The transit in Lisbon is characterized by lower equity in transit provision, in particular between the north and the south due to the natural boundary between them, but different age groups pay the same because the concessionary fares have been recently cancelled. Students residing in the center of the metropolitan area in both cities perceive lesser spatial unfairness between the core and the periphery and higher mode fairness, likely because they enjoy a high level of service and connectivity to most of the metropolitan area. Students living in the northern part of Lisbon perceive lesser spatial unfairness between the north and the south of the

metropolitan area, possibly because this part of the metropolitan area enjoys high connectivity.

Questionnaire item	Factor	Mean	S.E	95% Lower bound	95% Upper bound
A3stud_perif	Spatial inequity between the center and the periphery	1.000	--	--	--
a3stud_perif_dir		0.815	0.004	0.710	0.936
a3stud_perif_info		0.761	0.005	0.624	0.902
a3stud_perif_wlk		0.861	0.003	0.742	0.985
a3stud_perif_wt		0.924	0.003	0.810	1.058
a4stud_south_saf	Spatial inequity between the north and the south	1.000	--	--	--
a4stud_south_dir		1.359	0.010	1.185	1.565
a4stud_south_info		1.126	0.008	0.978	1.328
a4stud_south_wlk		1.169	0.008	1.017	1.368
a4stud_south_wt		1.424	0.009	1.255	1.637
a4stud_south		1.276	0.007	1.096	1.483
a2diff_stud_fort	Price unfairness	1.000	--	--	--
a2diff_stud_old		1.148	0.006	0.957	1.366
a2diff_stud_teen		1.250	0.009	1.047	1.538
a2stud_old		1.288	0.007	1.071	1.532
a2stud_teen		1.352	0.005	1.102	1.644
Ctt_car_univ	Travel mode fairness	1.000	--	--	--
ttime_min		-9.241	0.095	-11.730	-7.074
q_ttime_u		0.734	0.005	0.596	0.893
ctt_car_leis		0.700	0.006	0.546	0.859
a6pt_wlkfar	Difficulties related to service quality	1.000	--	--	--
a6pt_longtime		1.267	0.006	1.102	1.644
a6pt_endsearly		1.052	0.006	1.065	1.540
a6pt_crowd		0.644	0.006	0.859	1.280
a6pt_freqlow		1.462	0.008	0.471	0.813
a6pt_schedule		1.317	0.006	1.208	1.740
a6pt_nexpensive	Ease of payment	1.000	--	--	--
a6byke_cheapr		0.465	0.005	0.282	0.617
a6pt_cheap		1.124	0.009	0.878	1.431
a6savemoneyr		1.303	0.009	0.980	1.681
a6pt_harassed	Perceived lack of personal security	1.000	--	--	--
a6pt_pickpocketing		1.338	0.006	1.172	1.519
a6pt_ridesaft		1.779	0.007	1.574	2.012
a6pt_walksaft		1.704	0.007	1.514	1.913
a5friendcar	Pro-car subjective norms	1.000	--	--	--
a5friendpt		-0.977	0.005	-1.171	-0.783
a5scirclept		0.953	0.006	0.775	1.140
a5friendbyke	Pro-cycling subjective norms	1.000	--	--	--
a5fambyke		0.539	0.002	0.477	0.602
a5carcool		-0.391	0.003	-0.465	-0.333
a5bykecool		0.694	0.002	0.638	0.749

Table 3 – Measurement equations

Variable name	Variable name	Mean	S.E	95% Lower bound	95% Upper bound
Regression weights					
Lisbon	Spatial inequity	0.260	0.005	0.113	0.395
Residence near the city center	center - periphery	-0.158	0.004	-0.290	-0.020
Lisbon	Spatial inequity	0.770	0.009	0.560	0.971
Living in the north of Lisbon	north - south	-0.593	0.008	-0.780	-0.407
Lisbon	Price unfairness	-0.377	0.003	-0.498	-0.257

Low-income		0.118	0.004	0.003	0.231
Residence near the city center	Travel mode fairness	0.399	0.004	0.231	0.578
male		-0.274	0.005	-0.442	-0.091
Transport expenditure from total		-0.274	0.005	-0.442	-0.091
Lisbon	Perceived lack of personal security	0.696	0.004	0.559	0.840
Male		-0.244	0.004	-0.362	-0.110
Lisbon	Pro-cycling subjective norms	-2.464	0.004	-2.603	-2.327
Covariates					
North of Lisbon and Lisbon		0.233	0.001	0.205	0.269
Transport expenditure and residence in the city center		-1.803	0.020	-2.452	-1.122
Transport expenditure and residence in Lisbon		3.956	0.024	3.247	4.898
North of Lisbon and residence in the city center		0.017	0.000	0.010	0.025
Transport expenditure from total and North of Lisbon		3.134	0.023	2.401	4.065

Table 4 – The linkage between individual characteristics and the TPB constructs

Explanatory factor	Explained factor	Mean	S.E	95% Lower bound	95% Upper bound
Spatial inequity center - periphery	Spatial inequity north-south	0.195	0.002	0.130	0.259
Spatial inequity center - periphery	Price unfairness	0.126	0.003	0.052	0.209
Spatial inequity center - periphery	Travel mode fairness	-0.372	0.006	-0.522	-0.225
Spatial inequity north - south	Difficulties related to service quality	0.088	0.003	-0.035	0.217
Spatial inequity center - periphery		0.141	0.004	0.039	0.253
price_unfairness		0.169	0.003	0.061	0.268
mode_fairness		-0.373	0.004	-0.512	-0.280
Lack of personal security		0.167	0.002	0.082	0.258
Pro-car social norms		0.131	0.003	0.045	0.241
Price unfairness	Ease of payment	-0.240	0.005	-0.405	-0.106
Difficulties related to service quality		-0.258	0.004	-0.385	-0.148
Pro-bike social norms		-0.156	0.002	-0.213	-0.108
Ease of payment	Frequency of transit use	1.077	0.012	0.752	1.440
Pro-car social network		-0.612	0.007	-0.809	-0.410

Table 5 – The linkage between fairness, spatial equity, service quality, payment ease and frequency of transit use

5. CONCLUSIONS

This study focuses on the effect of perceived fairness and corporate social responsibility on habitual transit use. Framed within the TPB, we investigated six hypotheses regarding the effect of price fairness, travel time fairness and spatial equity in transit provision on the perception of transit service quality, willingness to pay and habitual frequency of transit use. The study was conducted among young people in Lisbon and Copenhagen to explore transit perceptions and use under different economic and transit provision conditions. The results extend findings from previous studies on fairness in transit (Eriksson et al., 2006; Drevs et al., 2014) by extending the concept of fairness also to travel time, considering fairness to oneself and for others, and confirming the research hypotheses on revealed preference data.

The results confirm the six postulated hypotheses by showing that young transit users in

their twenties are concerned about price and travel time fairness for themselves as well as spatial equity between north and south and between core and peripheral areas in transit service provision. In particular, higher perceived fairness relate positively to higher perceived quality of transit service and higher perceived ease of paying for transit use. Higher perceived spatial equity in service provision is associated with higher perceived service quality. Higher perceived service quality relates to higher perceived ease of payment, which links to higher frequency of transit use. The results largely agree with the results for consumption of products and services in other industrial sectors (e.g., Arredondo Trapero et al., 2010; Lotz et al., 2013; Webb et al., 2008; Xia et al, 2004). The agreement is non-trivial because transit is a public service and thus essentially differs from private sector products and services. Unlike the private sector, transit is a regulated market and some transit users are captives.

The results bear important policy implications. Firstly, the results show that while transit providers currently do not brand or market their systems as fair or equitable, transit users, and particularly young people, are sensitive to fairness and equity considerations. Transit operators could consider this issue in their branding strategy, as transit users can experience the level of service and accessibility for their own activity patterns as well as for others. Secondly, the results show that the Copenhagen finger plan is highly efficient not only in terms of its objective functionality in service provision, but also in promoting the perceived equity in service provision. Thirdly, the results show that in Lisbon young people associated higher fairness to the pricing scheme compared to young people Copenhagen, which in turn is associated with higher perceived service quality, payment ease and transit use. Possibly, the reason lies in the recent cancellation of concessionary fares in Lisbon, while in Copenhagen young people in their twenties are aware of the concessionary fares to adolescents and perceive their own purchase power as lower than older adult groups. Ironically, while the cancellation of the concessionary fares raised the prices paid by elderly and adolescents, young people perceive it as more equitable. Transit operators could consider extending the concessionary fares to students, as well as improving the justifiability of the concessionary fares as a market strategy for mitigating price unfairness. Last, the results are stable across countries with different economic conditions and transit provision in terms of level of service, comfort and information. A possible policy implication could be that higher level of service and connectivity are related to higher expectations for service availability, quality, reliability and comfort, which in turn affect the fairness and spatial equity perception. Transit operators could consider providing their users with benchmarking information of the transit service as part of their marketing strategy.

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